

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : **BOX PATENT APPLICATION**  
Philippe LECOUR et al. : Examiner: Unassigned  
Serial No.: Unassigned : Group Art Unit: Unassigned  
Filed: January 15, 2002 :  
For: **USE OF AUSTENITIC STAINLESS STEELS IN APPLICATIONS REQUIRING  
ANTI-COKING PROPERTIES**

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, Applicants wish to amend the above-identified application as indicated below:

**IN THE CLAIMS:**

Please amend the claims as follows:

1. (Amended) A process of diminishing coking in a petrochemical process conducted in contact with a surface subjected to coking, comprising providing said surface, at least in part with an austenitic steel comprising:

- at most 0.15% of C;
- 2% to 10% of Mn;
- at most 2% of Ni;
- at most 4% of Cu;
- 0.1% to 0.4% of N;
- 10% to 20% of Cr;
- at most 1% of Si;
- at most 3% of Mo; and
- at most 0.7% of Ti.

2. (Amended) A process according to claim 1, wherein said steel comprises:
  - at most 0.1% of C;
  - 5% to 10% of Mn; and
  - 5% to 18% of Cr.
3. (Amended) A process according to claim 1, wherein said steel comprises:
  - about 0.05% of C;
  - about 7.5% of Mn;
  - about 1.5% of Ni;
  - about 2.5% of Cu;
  - about 0.15% of N;
  - about 18% of Cr; and
  - about 0.5% of Si.
4. (Amended) A process according to claim 1, wherein said steel comprises:
  - about 0.04% of C;
  - about 10% of Mn;
  - about 1.5% of Ni;
  - about 4% of Cu;
  - about 0.1% of N;
  - about 17% of Cr;
  - about 0.5% of Si; and
  - about 0.7% of Ti.
5. (Amended) A process according to claim 1, wherein said steel comprises:
  - about 0.05% of C;
  - about 8.5% of Mn;
  - about 1.5% of Ni;
  - about 3% of Cu;
  - about 0.2% of N;
  - about 17% of Cr;

- about 0.5% of Si; and
- about 2.1% of Mo.

6. (Amended) A process according to claim 1, wherein said steel comprises:

- at most 0.01% of S;
- at most 0.05% of P; and
- at most 0.005% of B.

7. (Amended) A process according to claim 6, wherein said steel comprises 0.0005% to 0.005% of B.

8. (Amended) A process according to claim 1, wherein said steel comprises:

- at most 0.030% of S; and
- at most 0.045% of P.

9. (Amended) A process according to claim 1, wherein said steel further comprises:

- at most 1.1% of Nb;
- at most 0.40% of V;
- at most 0.05% of Al; and
- at most 0.002% of Ca.

10. (Amended) An article of manufacture comprising an austenitic structure steel comprising:

- at most 0.15% of C;
- 2% to 10% of Mn;
- at most 2% of Ni;
- at most 4% of Cu;
- 0.1% to 0.4% of N;
- 10% to 20% of Cr;
- at most 1% of Si;

- at most 3% of Mo; and
- at most 0.7% of Ti.

11. (Amended) An article according to claim 10, at least partially coated with said austenitic steel.

Please cancel claim 12 without prejudice or disclaimer.

13. (Amended) A method of manufacturing an article according to claim 11, comprising conducting at least one technique selected from co-centrifuging, plasma, PVD, CVD, electrolytic deposition, overlay and plating of said austenitic steel.

14. (Amended) A process according to claim 1, wherein said petrochemical process is carried out at temperatures of 350°C to 1100°C.

15. (Amended) A process according to claim 14, wherein said petrochemical process is a catalytic reforming process that produces a reformat at temperatures of 450°C to 650°C.

16. (Amended) A process according to claim 14, wherein said petrochemical process is isobutane dehydrogenation to produce isobutene at temperatures of 550°C to 700°C.

Please add the following new claims:

--17. An austenitic stainless steel with a composition comprising:

- at most 0.15% of C;
- 2% to 10% of Mn;
- at most 2% of Ni;
- at most 4% of Cu;
- 0.1% to 0.4% of N;
- 10% to 20% of Cr;
- at most 1% of Si;

- at most 3% of Mo; and
- at most 0.7% of Ti.

18. A steel according to claim 17, comprising:

- at most 0.1% of C;
- 5% to 10% of Mn; and
- 5% to 18% of Cr.

19. A steel according to claim 17, comprising:

- at most 0.01% of S;
- at most 0.05% of P; and
- at most 0.005% of B.

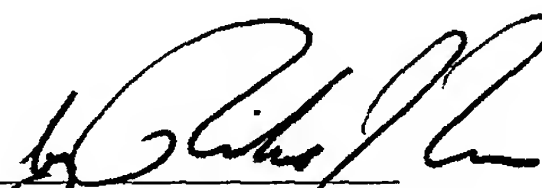
20. A steel according to claim 17, comprising 0.0005% to 0.005% of B.--

### REMARKS

A principal purpose of this Preliminary Amendment is to remove the multiply dependent claims and avoid the fee associated therewith, applicant reserving the right to reintroduce claims to canceled combined subject matter. The preliminary amendment also serves to define methods of this invention in a form more common than "use" claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version With Markings To Show Changes Made**".

Respectfully submitted,

*I.W. Millen*  30595  
I. William Millen (Reg. No. 19,544)  
Attorney for Applicants

MILLEN, WHITE, ZELANO & BRANIGAN, P. C.  
2200 Clarendon Boulevard, Suite 1400  
Arlington, Virginia 22201  
(703)812-5325  
Internet address: millen@mwzb.com

**Filed: January 15, 2002**

IWM(pdr)K:\PET\1981\prelim amend.wpd

## Version With Markings To Show Changes Made

### In the Claims

The claims have been amended as follows:

1. (Amended) ~~Use of a steel in the manufacture of or coating of equipment or an element of equipment characterized in that, in order to provide the equipment or element of equipment with improved coking resistance properties, said steel is an austenitic steel with a composition comprising~~ A process of diminishing coking in a petrochemical process conducted in contact with a surface subjected to coking, comprising providing said surface, at least in part with an austenitic steel comprising:

- at most 0.15% of C;
- 2% to 10% of Mn;
- at most 2% of Ni;
- at most 4% of Cu;
- 0.1% to 0.4% of N;
- 10% to 20% of Cr;
- at most 1% of Si;
- at most 3% of Mo; and
- at most 0.7% of Ti.

2. (Amended) ~~Use~~ A process according to claim 1, ~~characterized in that~~ wherein said steel comprises:

- at most 0.1% of C;
- 5% to 10% of Mn; and
- 5% to 18% of Cr.

3. (Amended) ~~Use~~ A process according to claim 1 ~~or claim 2, characterized in that~~ , wherein said steel comprises:

- about 0.05% of C;
- about 7.5% of Mn;

- about 1.5% of Ni;
- about 2.5% of Cu;
- about 0.15% of N;
- about 18% of Cr; and
- about 0.5% of Si.

4. (Amended) ~~Use A process~~ according to claim 1 ~~or claim 2~~, characterized in that , wherein said steel comprises:

- about 0.04% of C;
- about 10% of Mn;
- about 1.5% of Ni;
- about 4% of Cu;
- about 0.1% of N;
- about 17% of Cr;
- about 0.5% of Si; and
- about 0.7% of Ti.

5. (Amended) ~~Use A process~~ according to claim 1 ~~or claim 2~~, characterized in that , wherein said steel comprises:

- about 0.05% of C;
- about 8.5% of Mn;
- about 1.5% of Ni;
- about 3% of Cu;
- about 0.2% of N;
- about 17% of Cr;
- about 0.5% of Si; and
- about 2.1% of Mo.

6. (Amended) ~~Use A process~~ according to ~~any one of claims 1 to 5~~, characterized in that claim 1, wherein said steel comprises:

- at most 0.01% of S;



- at most 0.05% of P; and
- at most 0.005% of B.

7. (Amended) ~~Use A process according to claim 6, characterized in that~~  
wherein said steel comprises 0.0005% to 0.005% of B.

8. (Amended) ~~Use A process according to any one of claims 1 to 7,~~  
~~characterized in that~~ claim 1, wherein said steel comprises:

- at most 0.030% of S; and
- at most 0.045% of P.

9. (Amended) ~~Use A process according to any one of claims 1 to 8,~~  
~~characterized in that~~ claim 1, wherein said steel further comprises:

- at most 1.1% of Nb;
- at most 0.40% of V;
- at most 0.05% of Al; and
- at most 0.002% of Ca.

10. (Amended) ~~Equipment or element of equipment, characterized in that it is~~  
~~manufactured in a steel as defined in any one of claims 1 to 9~~ An article of manufacture  
comprising an austenitic structure steel comprising:

- at most 0.15% of C;
- 2% to 10% of Mn;
- at most 2% of Ni;
- at most 4% of Cu;
- 0.1% to 0.4% of N;
- 10% to 20% of Cr;
- at most 1% of Si;
- at most 3% of Mo; and
- at most 0.7% of Ti.

11. (Amended) ~~Equipment or element of equipment, characterized in that it is coated with a steel as defined in any one of claims 1 to 9~~ An article according to claim 10, at least partially coated with said austenitic steel.

Claim 12 has been cancelled.

13. (Amended) A method of manufacturing an ~~element of equipment~~ article according to claim 11, ~~characterized in that it employs~~ comprising conducting at least one technique selected from co-centrifuging, plasma, PVD, CVD, electrolytic deposition, overlay and plating of said austenitic steel.

14. (Amended) ~~Use of equipment~~ A process according to claim 10 ~~or claim 11 in implementing a 1, wherein said~~ petrochemical process is carried out at temperatures of 350°C to 1100°C.

15. (Amended) ~~Use~~ A process according to claim 14, ~~characterized in that~~ wherein said petrochemical process is a catalytic reforming process that produces a reformat at temperatures of 450°C to 650°C.

16. (Amended) ~~Use~~ A process according to claim 14, ~~characterized in that~~ wherein said petrochemical process is isobutane dehydrogenation to produce isobutene at temperatures of 550°C to 700°C.

Claims 17-20 have been added.